The path to sustainability

Understanding organisations' environmental initiatives and climate change in an emerging economy

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Abstract

Purpose – Climate change has become an increasingly important issue globally, and organisations are being urged to be more carbon friendly by taking initiatives to reduce carbon emissions in their business operations. The purpose of this paper is to examine the extent to which climate change has been addressed and the influence of financial strength and corporate governance structure on the disclosure of carbon information.
Design/methodology/approach – The research process consists of an investigation via content analysis of the annual and sustainability reports of the top 100 public-listed companies in Malaysia for the year 2017.
Findings – The results of the study revealed that carbon information on carbon emissions accounting had the highest disclosure and that climate change risks and opportunities had the lowest disclosure. The results of the multiple regression analysis revealed that profitability is positively significant with carbon disclosure while leverage is negatively significant. However, the governance structure does not seem to have any influence on the disclosure of carbon information.
Research limitations/implications – The conclusions drawn from the study must be interpreted with caution as the sample companies only comprise of the top 100 public-listed companies in Malaysia to provide an initial insight into the situation in Malaysia. Furthermore, the interpretations and conclusions drawn from this study are based solely on a cross-sectional analysis of the data for only one year.
Practical implications – This finding is a significant contribution to regulatory bodies and policymakers regarding the drivers of climate change initiatives in an emerging economy such as Malaysia. This finding suggests that in the Malaysian setting, financial structure influence decisions on climate change initiatives.
Social implications – The commitment by business leaders of the impact on climate from the production processes would contribute towards a low carbon economy and subsequently improve the quality of life of the community.
Originality/value – The findings of the study provide insight of the business attitude towards climate change in an emerging economy such as Malaysia.

Keywords Corporate governance, Carbon disclosure, Financial strength

Paper type Research paper

1. Introduction

The issue of climate change has already transgressed the planetary boundaries and has become prominent in politics and media (Rockstrom *et al.*, 2009). Initiatives involving preservation of the environment are crucial, as, globally, companies are dependent on the foreign economic networks

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that require companies to be more environmentally friendly. The launching of the Sustainable Development Goals on 1 January 2016 provides a platform that allows a more concerted effort in directing sustainability globally. Malaysia, as one of the most attractive emerging economies in the South-East Asian region, is also committed to the sustainability agenda that, potentially, would contribute significantly to achieving Malaysia's aspiration to be a high income developed nation. Malaysia also aspires to position itself as the home for Sustainable Responsible Investment (SRI) as part of its ambition to make Malaysia a green technology hub by 2030. Various initiatives have been undertaken by the Malaysian government to push this agenda forward. The introduction of the Environmental, Social and Governance Index by the Malaysian Stock Exchange (Bursa Malaysia) in 2014, and the introduction of the world's first green Islamic bond (sukuk) in 2018 to provide an innovative channel to address global funding gaps in green financing are examples of such initiatives. Such commendable actions are to encourage the Malaysian organisations, especially the public-listed companies, to pursue efforts to preserve the environment and the natural resources of the country, to conserve the use of energy, to promote the use of renewable energy and to reduce greenhouse gas emissions.

In line with the Malaysian government's aspiration, the top management of organisations in Malaysia are slowly embarking on sustainability initiatives in their organisations' practices to ensure that sustainable initiatives are embedded in their products and services (González-Benito and González-Benito, 2006). The implementation of these initiatives is normally disclosed through various media, such as the companies' websites, media releases, sustainability and annual reports. Regarding environmental preservation, the issue of business practices that affects climate change around the world has implications beyond the typical environmental dimensions. Such practices are being linked to energy security and efficiency, and the fate of the planet as a whole. The issue of climate change has been brought to the fore as an urgent and harmful condition that requires a concerted policy approach, and, thus, has become a topic of societal, regulatory and corporate attention (Pinkse *et al.*, 2008). This study focuses on the issue of climate change and the initiatives taken by Malaysian public-listed companies to reduce greenhouse gas emissions in the production of goods and services. Therefore, the main aim of this research is to examine to what extent environmental initiatives relating to climate change have been incorporated into organisations' practices in producing products and services and the influence of financial strength and corporate governance structure on the disclosure of information relating to climate change initiatives among Malaysian public-listed companies. Specifically, the study is interested in finding the answers to the following questions:

RQ1. To what extent are climate change initiatives being incorporated by Malaysian public-listed companies in the production of their goods and services?

RQ2. Do financial strength and corporate governance structure influence the decisions of management to incorporate climate change initiatives in the production of their goods and services?

In this study, it is argued that financial strength affects management decisions concerning such initiatives as they require substantial resources (Luo *et al.*, 2013). The governing features of organisations, such as CEO duality and board composition, are also expected to influence such initiatives. Over the years, the monitoring of business activities has been increased by stakeholders (Ahmad and Hossain, 2015; Rockstrom *et al.*, 2009). Therefore, stakeholder theory is used to underpin the arguments for the study. The research process consists in an investigation via content analysis of the annual and sustainability reports of the top 100 public-listed companies for the year 2017 to provide an overview of the climate change initiatives that have been adopted by these companies to produce their products and services, specifically, those relating to greenhouse gas emissions. The information disclosed by these organisations forms the basis of the data collection to gauge their initiatives in the context of climate change.

First, a review of the existing literature and hypotheses development is provided. Then the method applied in the current study is outlined, followed by the findings of the research. Lastly, the results are discussed, and the paper is concluded by explaining the study's limitations and suggestions for future researchers.

2. Literature review and hypotheses development

2.1 Stakeholder theory

Stakeholder theory has been widely used in empirical research on environmental studies. Stakeholders are individuals or groups that have a direct influence on the organisation's welfare (Freeman, 1994). Therefore, stakeholder theory argues that the management of an organisation should take into account the interests of their stakeholders in making business decisions.

In this study, it is argued that the organisations will be influenced by the demands of their stakeholders in developing policies on climate change, as, currently, stakeholders globally view climate change as a critical environmental problem.

This is consistent with Jensen (2001) who argued that organisations that merely focus on maximising profit will produce short-term financial performance, which could destroy the value of the firm. Therefore, organisations should initiate stakeholder engagement in a formal process to align the interests of the organisation with those of the stakeholders (Lingenfelder and Thomas, 2011). Such actions will reduce the relevant risk and will allow the organisation to improve its financial, social and environmental performance.

Even though stakeholder theory is frequently used to underpin studies on CSR, including issues concerning the environment, there are arguments that the stakeholder theory only serves certain stakeholder groups that are of interest to the organisation, thereby resulting in organisations' prioritising certain stakeholder groups based on the power, legitimacy and urgency of the issues affecting the organisation (Altman and Cooper, 2004). Haque and Islam (2015), for example, found that some stakeholder groups may have little power to exert pressure to produce climate change-related practices, such as accounting professionals and suppliers, unlike other stakeholders groups – government bodies, institutional investors and the media – that can exert pressure and are powerful in influencing disclosure of climate change information. Such findings may result in organisations only focusing on engaging with certain stakeholder groups according to the issues at hand.

2.2 Climate change and carbon disclosure

Developed and developing countries are both looking at the issues of climate change and carbon disclosure, and many proactive measures are being employed by countries around the world. Some examples of these measures are carbon disclosure by companies, international agreement on carbon reduction target, and climate change conferences. Climate is the average or typical weather of a region or a city (NASA, 2011). Therefore, climate change is basically the change in the average or typical weather of a region or a city. This could mean a change in average temperature or average annual rainfall. Climate change is being debated intensely by politicians, economists, activists, and other stakeholders, and actions condemning the ignorance about climate change are noteworthy and numerous. Global warming has been found to be a specific consequence of greenhouse gas emissions (UNEP & UNFCCC, 2002). Human activities have caused the release of GHG into the atmosphere, with the biggest blame for global warming being attributed to companies, as their operations are on a much bigger scale compared to those of individuals.

2.3 Profitability

Profitable companies have more resources and are more likely to invest in a voluntary initiative, such as carbon disclosure, compared to companies that are less profitable

(Luo *et al.*, 2013). Highly profitable companies need to be seen as being more responsive towards the environment (Magnan *et al.*, 2005). It is also found that profitable companies can afford the potential damage from the information disclosed as the damage will be covered by the transparency-induced increment in share valuation. Saka and Oshika (2014) also found a positive association between carbon management disclosure and share valuation. Therefore, profitable companies dare to be more transparent about their business activities compared to less profitable companies (Magnan *et al.*, 2005). Less profitable companies may not be able to cope with the damage done by the information disclosed, and, thus, disclose less environmental information as a precautionary step. Less profitable companies are more focused on their financial commitments and operational needs, and have less resources for managing and reporting their carbon emissions (Prado-Lorenzo *et al.*, 2009).

In this study, it is argued that profitable companies will disclose more information on climate change initiatives:

H1. Profitability is positively and significantly related to carbon disclosure.

2.4 Growth

Previous literature found a significant negative relationship between growth and carbon disclosure (Luo *et al.*, 2013). Companies in the growing stage focus more on reinvestment for expansion than environmental strategies such as carbon disclosure (Waldman *et al.*, 2006). According to Prado-Lorenzo *et al.* (2009), companies with high growth opportunity will prioritise economic objectives more than environmental considerations. The argument being that companies undergoing high growth will allocate more resources to growth or expansion strategies rather than carbon disclosure. Although disclosing more information may be considered to be transparent, being too transparent can cause unnecessary exposure to competitors, which is the fear of companies with a high growth rate (Prencipe, 2004).

On the other hand, companies with a high growth rate provide investment opportunities, and, to attract investment, these companies take initiatives to disclose valuable information to allow stock analysts and institutional investors to have a positive perception about their companies (Brammer and Pavelin, 2008). Al-Khater and Naser (2003) also found that CSR disclosure helps users to make informed decisions regarding the companies. However, this study expects that companies with a high growth rate in developing countries would disclose less carbon information as they would focus more on reinvestment for expansion rather than on emerging issues relating to the environment.

Kallapur and Trombley (1999) pointed out that several proxies have been used in the accounting and finance literature to capture the growth opportunities of firms. This is because the concept of growth opportunities is not directly observable as it is contingent on discretionary expenditures and firm specific factors. In this study, the growth rate of revenue is used to measure the growth opportunities of the companies (Luo *et al.*, 2013).

Therefore, the second hypothesis developed for this study is as follows:

H2. Growth is negatively and significantly related to carbon disclosure.

2.5 Leverage

Past literature found a significant negative relationship between leverage and carbon disclosure (Chithambo and Tauringana, 2014; Luo *et al.*, 2013), with companies with higher leverage focusing more on fulfilling their financial commitments over voluntary strategies. Highly leveraged companies would have to commit larger resources in servicing the debts and financial commitments compared to lowly leveraged companies. A contrasting argument is that companies with high leverage would disclose more voluntary information (Prencipe, 2004). If the companies with a high leverage rate are making an effort to attract investors, they

would disclose more voluntary information. Valuable information allows stock analysts and institutional investors to have positive perceptions about the companies and helps users to make informed decisions (Al-Khater and Naser, 2003; Brammer and Pavelin, 2008).

However, in this study, it is expected that leverage and carbon disclosure will have a negative relationship because highly leveraged companies in developing countries, such as Malaysia, will be more focused on generating profits and increasing productivity due to their financial position rather than embarking on voluntary carbon initiatives (Mohamed Zain, 2009). Therefore, the third hypothesis developed for this study is as follows:

H3. Leverage is negatively and significantly related to carbon disclosure.

2.6 CEO duality

CEO duality causes a concentration in the decision-making authority, which, subsequently, affects the board independence in carrying out its oversight and governance roles (Gul and Leung, 2004). CEO duality can affect decision-making pertaining to the voluntary disclosure of information, particularly carbon information, which requires large resources (Luo *et al.*, 2013). Furthermore, the disclosure of carbon information comes with a potential cost in that outside stakeholders can use the information negatively. The potential costs include damage to reputation, litigation risks and loss of competitive advantage (Guo, 2014). The perception of the stakeholders concerning the information disclosed can adversely affect the market for the company. Therefore, when the CEO is also the chairman, they would restrict the voluntary disclosure of information that would affect the reputation of the company. Thus, the fourth hypothesis for this study is as follows:

H4. CEO duality is negatively and significantly related to carbon disclosure.

2.7 Board composition

Carroll (2015) found that the board of directors plays an important role in voluntary information disclosure. Therefore, it is critical that the board of directors remains independent in carrying out its oversight and governance roles. Independent directors allow the board of a company to be more independent in its oversight and governance roles (Gul and Leung, 2004). A study conducted by Matolcsy *et al.* (2007) on 181 companies listed on the Australian Stock Exchange in 2001 discovered that the presence of independent directors on the board increases corporate voluntary disclosure. The presence of independent directors on the board is to gain the public perception that there are experts on the board that can monitor the performance of the company and can help to push companies into disclosing more voluntary information (Patelli and Prencipe, 2007; Samaha *et al.*, 2015). Moreover, García-Meca and Sánchez-Ballesta (2010) argued that independent directors pressure other directors to improve corporate reporting policy by increasing the disclosure of voluntary information.

Thus, the fifth hypothesis for this study is as follows:

H5. The presence of Independent directors is positively and significantly related to carbon disclosure.

2.8 Size

Much of the previous literature found a significant positive relationship between company size and the quality of disclosure (Chithambo and Tauringana, 2014; Choi *et al.*, 2013; Sulaiman *et al.*, 2014). In this study, size is proxied by the availability of the total assets to the firm (Brammer and Pavelin, 2006; Zeng *et al.*, 2012). Basically, larger companies operate on a larger scale, thus having a bigger impact on the environment (Burgwal and Vieira, 2014). According to Huang and Kung (2010), bigger companies rely on political and social support, and they

have higher political cost as they receive pressure from the government, unions and consumers. However, their large operations across the globe make them more visible than other companies, and, thus, they face more intense pressure to disclose information voluntarily to remain legitimate (Shamil *et al.*, 2014). Burgwal and Vieira (2014) also found that bigger companies safeguard their public image by disclosing environmental information.

Thus, in this study, the size of the company is included as the control variable.

3. Research methodology

3.1 The sample

A content analysis of the annual and sustainability reports of the top 100 public-listed companies in Malaysia for the year 2017 was performed. Table I presents the distribution of the sample size of the companies selected according to industry. These industries were considered as environmentally sensitive by previous literature (Buniamin, 2012; He and Loftus, 2014) due to the nature of their operations. Specifically, these industries represent the environmentally sensitive industries listed on the Malaysian stock-exchange. The choice of the top 100 companies is because carbon disclosure is a relatively new phenomenon in Malaysia, and it is expected that only the top 100 companies listed on the Malaysian stock-exchange will take the voluntary initiatives to provide carbon information initiatives in their annual and sustainability reports. These companies are deemed financially capable and have the necessary expertise to engage in such voluntary initiatives.

3.2 Carbon disclosure

A carbon disclosure index from Choi *et al.* (2013), Luo *et al.* (2013), Peng *et al.* (2014) and Saka and Oshika (2014) with modifications to suit the Malaysian context was used in this study to measure the quality of carbon information disclosed. A scoring of 0–4 was used to evaluate the quality of information disclosed. Such a measurement is in accordance with prior literature (Yusoff *et al.*, 2015). A score of "4" was given to carbon information disclosed quantitatively with monetary values. A score of "3" was given to carbon information disclosed quantitatively with no monetary values. A score of "2" indicated specific information on carbon disclosure but non-quantitative. General information disclosed was awarded a score of "1". If there was no carbon information, a score of "0" was given.

The dimension and measurement for each item of carbon information disclosed are listed in Table II.

The disclosure of the carbon information was assessed using an equal-weighted index, where a point is awarded for each item disclosed. The index indicates the score for the disclosure of carbon information for company j, where N is the maximum number of relevant items a company may disclose and d_j is ranked from a score of 0 to 4:

$$\sum_{i=1}^{m_j} \frac{d_j}{N}.$$

Table I. Distribution of companies based on industry classification

No.	Industry	No.	%
1.	Industrial Products	20	20
2.	Consumer Products	13	13
3.	Construction	3	3
4.	Plantation	11	11
5.	Properties	13	13
6.	Infrastructure Project Companies (IPCs)	4	4
7.	Trading/Services	36	36
	Total	100	100

No.	Dimension	Measurement
1.	Climate change risks and opportunities (CC)	CC1 – Description of the risks (regulatory, physical or general) relating to climate change and actions taken or to be taken to manage the risks CC2 – Description of current (and future) financial implications, business implications, and opportunities of climate change
2.	Carbon emissions accounting (GHG)	GHG1 – Description of the methodology used to calculate GHG emissions (e.g. GHG protocol or ISO) GHG2 – Existence of external verification on quantity of GHG emissions – if so by whom and on what basis GHG3 – Evidence of total GHG emissions – metric tonnes of CO_2-e emitted, cost associated GHG4 – Evidence of disclosure by Scopes 1 and 2, or Scope 3 direct GHG emissions. GHG5 – Evidence of disclosure of GHG emissions by source (e.g. coal, electricity, etc.) GHG6 – Evidence of GHG emissions in comparison with previous years GHG7 – Description of reasons for the changes in level of emissions from year to year
3.	Energy consumption accounting (EC)	EC1 – Evidence of total energy consumed in business operations (e.g. tera-joules or peta-joules) EC2 – Evidence of energy used from renewable sources EC3 – Description of disclosure by type, facility or segment
4.	Carbon reduction and costs (RC)	RC1 – Evidence of detailed plans or strategies to reduce GHG emissions RC2 – Specification of GHG emissions reduction target level and target year RC3 – Description of emissions reduction and associated costs or savings to date as a result of the reduction plan RC4 – Description of future emissions factored into capital expenditure planning
5.	Carbon emissions accountability (ACC)	ACC1 – Evidence of specific board committee (or other executive body) that has the overall responsibility for actions related to climate change ACC2 – Description of the mechanism by which the board (or other executive body) reviews the company's progress regarding climate change

Table II. Dimension and measurement of carbon disclosure index

The total maximum score for a company m_j is 72, comprising each dimension; climate change risks and opportunities (8), carbon emissions accounting (28), Energy consumption accounting (12), carbon reduction and costs (16), carbon emissions accountability (8). A pilot test on a sample of ten annual reports was undertaken to ensure the suitability of the items.

Table III presents the measurement of the independent and control variables used in this study.

Variables	Measurement
Profitability (ROA)	Net income divided by the average of total assets for the year (Chithambo and Tauringana, 2014; Choi *et al.*, 2013; Luo *et al.*, 2013)
Growth (GRW)	Current year's revenues divided by the revenues from the previous four years (Luo *et al.*, 2013)
Leverage (LEV)	Total debt divided by total assets (Clarkson *et al.*, 2011; Luo *et al.*, 2013)
CEO duality (CEOD)	A dichotomous scale of 1 or 0. A score of 1 when the CEO and chairman are the same person, and a score of 0 for companies with separation of power (Donnelly and Mulcahy, 2008; Qu *et al.*, 2013)
Board composition (BCOM)	Number of independent directors divided by the total number of directors on the board (Matolcsy *et al.*, 2007)
Size (LnSIZE)	Natural logarithm of total assets (Brammer and Pavelin, 2006; Zeng *et al.*, 2012)

Table III. Measurement of independent and control variables

4. Findings and discussion

4.1 Descriptive analysis

The descriptive statistics for the continuous and the categorical variables were performed separately to ensure the suitability of the mean and standard deviation for each category (Pallant, 2011). Table IV presents the descriptive analysis of the variables in this study.

The mean profitability for the sample companies is 5.34 per cent. The range of profitability of sample companies is −4.451 to 16.143 per cent. The results indicated that the majority of the sample companies are profitable. An ROA of more than 5 per cent is considered to be satisfactory (McClure, 2016). The variable growth indicates that the growth rate is within the range of −20.07 to 25.96 per cent, with a mean of 4.62 per cent. The leverage of the sample companies indicated that the companies are all leveraged through some form of debt financing with a maximum at 61.20 per cent, and a mean of 24.74 per cent. The minimum score for the variable board composition is 12.50 per cent with a maximum of 75.00 per cent. The mean of 46.70 per cent indicates that, on average, the board composition of these companies comprises more executive directors than independent directors. The log of total assets to measure the size of companies ranges from 12.39 to 18.79. The carbon disclosure quality for 2017 is within the range of 0.00–47 with a mean score of 15.70. The full score for the carbon disclosure index that a company can achieve is 72. This shows that the carbon disclosure quality in 2017 was still poor, as the highest score obtained in 2017 was only 47.

The results also revealed that 46 out of 84 companies have a separate CEO and chairman of the board. This represents 54.8 per cent with CEO separation. On the other hand, 38 companies have the same person acting as both CEO and chairman of the board. This represents 45.2 per cent of the sample size and indicates that quite a number of companies still have CEO duality roles that can cause a concentration in the decision-making authority, and, as suggested by Gul and Leung (2004), can subsequently affect the board independence in carrying out its oversight and governance roles.

Table V presents the descriptive statistics for the carbon disclosure by the dimensions. The results revealed that the highest mean score for disclosure on carbon information

Table IV. Descriptive statistics for independent, control and dependent variables

Variables	*n*	Min.	Max.	Mean	SD
Profitability	84	−4.45	16.14	5.34	4.28
Growth	84	−20.07	25.96	4.62	9.37
Leverage	84	0.00	61.20	24.74	16.32
Board Composition	84	12.50	75.00	46.70	13.04
Size	84	12.39	18.79	15.70	1.30
Carbon Disclosure (CD)	84	0	47	22.81	14.18

Variable	CEO duality		CEO separation		Total	
	Frequency	%	Frequency	%	Frequency	%
CEO duality	38	45.2	46	54.8	84	100

Table V. Descriptive statistics of carbon disclosure (CD) 2017 by the dimensions

No.	Dimensions	*n*	Min.	Max.	Mean	SD
1.	Climate change risks and opportunities	84	0.00	8.00	1.98	2.14
2.	Carbon emissions accounting	84	0.00	24.00	7.96	9.00
3.	Energy consumption accounting	84	0.00	11.00	4.82	4.35
4.	Carbon reduction and costs	84	0.00	16.00	4.72	4.63
5.	Carbon emission accountability	84	0.00	6.00	3.34	1.47
	All dimensions			22.82		

relates to carbon emissions accounting (mean score 7.96). This is a positive development as it indicates that the companies are disclosing the methods that they use to account for GHG emissions that result from the production of goods and services, including the methodology used to calculate the GHG emissions. The lowest disclosure is for the dimension climate change risks and opportunities (mean score 1.98). This suggests that Malaysian public-listed companies have yet to use a proper framework to assess the risks and opportunities relating to climate change including the description of the current (and future) financial implications, business implications and opportunities arising from climate change.

Table VI presents the results of the Pearson correlations between the independent variables and carbon disclosure. The results show that profit, growth, leverage and CEO duality are negatively correlated with carbon disclosure quality. However, only CEO duality has a significant weak negative relationship with carbon disclosure (−0.298). This implies that companies with CEO duality will disclose low levels of carbon information. The variables board composition and size are positively correlated with carbon disclosure. However, size, with a Pearson correlation of 0.398, is significant suggesting that larger companies will disclose more carbon information. The bi-variate correlations among the independent variables are less than 0.7, indicating that there is no multicollinearity among the independent variables (Tabachnick and Fidell, 2001).

4.2 Multiple regression analysis

In this study, linear multiple regression is used as the basis of analysis for testing *H1–H5*. The hypothesised relationships are modelled as follows:

$$\mathrm{CD} = \beta_0 + \beta_1(\mathrm{ROA}) + \beta_2(\mathrm{GRW}) + \beta_3(\mathrm{LEV}).$$

$$+ \beta_4(\mathrm{CEOD}) + \beta_5(\mathrm{BCOM}) + \beta_6(\mathrm{LnSize}) + \varepsilon.$$

In the above regression model, the presence of multicollinearity was further tested using the variance inflation factor (VIF) and tolerance values. The results from Table VII reveal that the VIF for all the independent variables is below 10 and the tolerance statistics is above 0.2, thus indicating that multicollinearity is non-existent in this study. The *F*-statistic for the model is 4.34 and is significant, while the adjusted R^2 coefficient is 0.20. The results indicate that two of the variables – profitability and leverage – are significant predictors for carbon disclosure, therefore, supporting *H1* and *H3*.

The results from Table VII confirm the findings from prior studies that profitable companies have more resources and are more likely to invest in initiatives to monitor the effect of their business operations on the environment (Luo *et al.*, 2013; Magnan *et al.*, 2005). These companies have more resources that can be used to plan, manage and account for the

	Profit	Growth	Leverage	CEO duality	Board composition	Size	Carbon disclosure
Profit	1	0.289**	−0.251*	0.032	−0.029	−0.263*	−0.014
Growth		1	−0.029	0.249*	0.003	−0.153	−0.197
Leverage			1	−0.186	−0.096	0.269*	−0.029
CEO duality				1	−0.050	−0.187	−0.298**
Board composition					1	0.167	0.059
Size						1	0.398**
Carbon disclosure quality							1

Notes: *,**Correlation is significant at the 0.05 and 0.01 levels, respectively

Table VI. Pearson correlations between variables – carbon disclosure and its determinants

	Coefficients	*t*-statistics	*p*-value	VIF	Tolerance
(Constant)	−40.169	−2.109	0.038		
Profitability	0.271	0.736	0.035*	1.238	0.807
Growth	−0.164	−1.007	0.685	1.179	0.848
Leverage	−0.151	−1.562	0.000**	1.228	0.814
CEO duality	−6.430	−2.144	0.464	1.128	0.887
Board composition	−0.048	−0.407	0.317	1.084	0.922
Size	4.536	3.809	0.122	1.201	0.833
R^2	0.26				
Adjusted R^2	0.20				
F-value	4.34				
p-value	0.001				

Table VII.
Regression results for carbon disclosure and its determinants

Notes: Coefficient for each variable is shown with *t*-statistics in parentheses. *Significant at 5 per cent level (one-tailed test); **significant at 1 per cent level (one-tailed test)

effect on their actions on the environment, which, in turn, fulfil the demand of stakeholders for a more comprehensive and transparent business reporting. Therefore, *H1* is accepted. *H3* expects that leverage is negatively and significantly related to carbon disclosure. The results of the study found a significant negative relationship between leverage and carbon disclosure. The results are consistent with the arguments made by Chithambo and Tauringana (2014), and Luo *et al.* (2013) who found similar results in their studies. The results suggest that companies with higher leverage would focus more on fulfilling their financial commitments over undertaking initiatives to mitigate climate change issues in their work environment. This could be because such initiatives would require financial resources and highly leveraged companies would prefer to commit their financial resources in servicing their debts and other financial commitments. Hence, *H3* is accepted.

All the other variables are insignificant. Therefore, *H2*, *H4* and *H5* are rejected.

5. Conclusion

Managing and communicating climate change approaches are critical, as such decisions can distinguish an organisation from others, and, in turn, result in a competitive advantage. Therefore, this study aims to examine the extent to which climate change issues have been incorporated into an organisation and the influence of financial strength and corporate governance structure on such initiatives. The research process consists in an investigation via content analysis of the annual and sustainability reports of the top 100 public-listed companies for the year 2017 to provide an overview of the climate change initiatives that have been adopted by these companies to produce their products and services.

Regarding the extent to which climate change initiatives are being incorporated by Malaysian public-listed companies in the production of their goods and services, the results revealed that carbon information on carbon emissions accounting had the highest disclosure. Such initiatives suggest that the companies are disclosing the methods that they used to account for GHG emissions including the methodology used to calculate GHG emissions. However, a structured framework relating to climate change risks and opportunities issues is still at a preliminary stage. As for the influence of financial strength and corporate governance structure on management decisions to incorporate climate change initiatives in the production of their goods and services, the results of the study revealed that financial strength influences the decisions on climate change initiatives. Profitability is positively significant while leverage is negatively significant with carbon disclosure. It is surprising that governance structures and the size of the companies did not influence carbon disclosure. The empirical findings suggest that CEO duality and board

composition, including the size of the companies, did not have the propensity to drive carbon emissions disclosures in Malaysia. This factor could be because the specific focus on mitigating climate change through the control of carbon emissions is a new phenomenon in an emerging market such as Malaysia.

This study contributes to the growing body of knowledge on carbon disclosure and factors affecting the disclosures in developing nations. Most previous research was carried out in the setting of a developed country, such as Australia, the UK, the USA and others (Chithambo and Tauringana, 2014; Choi *et al.*, 2013; Saka and Oshika, 2014). The study also revealed that financial strength rather than governance structure influences the decisions on climate change initiatives. This finding is a significant contribution to regulatory bodies and policymakers regarding the drivers of climate change initiatives in an emerging economy such as Malaysia.

The conclusions drawn from the study must be interpreted with caution as the sample companies only comprise the top 100 public-listed companies in Malaysia to provide an initial insight into the situation in Malaysia. Furthermore, the interpretations and conclusions drawn from this study are based solely on a cross-sectional analysis of the data for only one year. Future studies may focus on examining the influence of financial strength and governance over an extended period. Additionally, this paper can be expanded to examine further the reasons behind the non-influence of growth, CEO duality and the presence of independent directors on carbon disclosures amongst companies in Malaysia.

References

Ahmad, N.N.N. and Hossain, D.M. (2015), "Climate change and global warming discourses and disclosures in the corporate annual reports: a study on the Malaysian companies", *Procedia – Social and Behavioral Sciences*, Vol. 172, pp. 246-253.

Al-Khater, K. and Naser, K. (2003), "Users' perceptions of corporate social responsibility and accountability: evidence from an emerging economy", *Managerial Auditing Journal*, Vol. 18 Nos 6/7, pp. 538-548.

Altman, W. and Cooper, C. (2004), "Integrating enterprise-wide risk management", *Engineering Management*, Vol. 14 No. 5, pp. 12-13.

Brammer, S. and Pavelin, S. (2006), "Voluntary environmental disclosures by large UK companies", *Journal of Business Finance and Accounting*, Vol. 33 No. 7, pp. 1168-1188.

Brammer, S. and Pavelin, S. (2008), "Factors influencing the quality of corporate environmental disclosure", *Business Strategy and the Environment*, Vol. 17 No. 2, pp. 120-136.

Buniamin, S. (2012), "The quantity and quality of environmental reporting in annual report of public listed companies in Malaysia", *Issues in Social and Environmental Reporting*, Vol. 4 No. 2, pp. 115-135.

Burgwal, D.V.D. and Vieira, R.J.O. (2014), "Environmental disclosure determinants in Dutch listed companies", *Revista Contabilidade & Finanças*, Vol. 25 No. 64, pp. 60-78.

Carroll, A.B. (2015), "Corporate social responsibility", *Organizational Dynamics*, Vol. 44 No. 2, pp. 87-96.

Chithambo, L. and Tauringana, V. (2014), "Company specific determinants of greenhouse gases disclosures", *Journal of Applied Accounting Research*, Vol. 15 No. 3, pp. 323-338.

Choi, B.B., Lee, D. and Psaros, J. (2013), "An analysis of Australian company carbon emission disclosures", *PacificAccounting Review*, Vol. 25 No. 1, pp. 58-79.

Clarkson, P.M., Li, Y., Richardson, G.D. and Vasvari, F.P. (2011), "Does it really pay to be green? Determinants and consequences of proactive environmental strategies", *Journal of Accounting and Public Policy*, Vol. 30 No. 2, pp. 122-144.

Donnelly, R. and Mulcahy, M. (2008), "Board structure, ownership, and voluntary disclosure in Ireland", *Corporate Governance: An International Review*, Vol. 16 No. 5, pp. 416-429.

Freeman, R.E. (1994), "The politics of stakeholder theory: some future directions", *Business Ethics Quarterly*, Vol. 4 No. 4, pp. 409-421.

García-Meca, E. and Sánchez-Ballesta, J.P. (2010), "The association of board independence and ownership concentration with voluntary disclosure: a meta-analysis", *European Accounting Review*, Vol. 19 No. 3, pp. 603-627.

González-Benito, J. and González-Benito, Ó. (2006), "A review of determinant factors of environmental proactivity", *Business Strategy and the Environment*, Vol. 15 No. 2, pp. 87-102.

Gul, F.A. and Leung, S. (2004), "Board leadership, outside directors expertise and voluntary corporate disclosures", *Journal of Accounting & Public Policy*, Vol. 23 No. 5, pp. 351-379.

Guo, Y. (2014), "2010 SEC climate change disclosure: determinants and impacts", University of Hawai'i at Manoa, Ann Arbor, MI (3648542 PhD), available at: http://search.proquest.com.ezaccess.library.uitm.edu.my/docview/1651539007?accountid=42518,ProQuestDissertations&ThesesGlobal database (accessed 1 December 2018).

Haque, S. and Islam, M.A. (2015), "Stakeholder pressures on corporate climate change-related accountability and disclosure: Australian evidence", *Business and Politics*, Vol. 17 No. 2, pp. 355-390.

He, C. and Loftus, J. (2014), "Does environmental reporting reflect environmental performance?: evidence from China", *Pacific Accounting Review*, Vol. 26 Nos 1/2, pp. 134-154.

Huang, C.L. and Kung, F.H. (2010), "Drivers of environmental disclosure and stakeholder expectation: evidence from Taiwan", *Journal of Business Ethics*, Vol. 96 No. 3, pp. 435-451.

Jensen, M.C. (2001), "Value maximisation, stakeholder theory, and the corporate objective function", *European Financial Management*, Vol. 7 No. 3, pp. 297-317.

Kallapur, S. and Trombley, M.A. (1999), "The association between investment opportunity set proxies and realized growth", *Journal of Business Finance and Accounting*, Vol. 23 No. 3, pp. 505-519.

Lingenfelder, D. and Thomas, A. (2011), "Stakeholder inclusiveness in sustainability reporting by mining companies listed on the Johannesburg securities exchange", *African Journal of Business Ethics*, Vol. 5 No. 1, pp. 1-13, available at: http://dx.doi.org/10.4103/1817-7417.86024

Luo, L., Tang, Q. and Lan, Y.C. (2013), "Comparison of propensity for carbon disclosure between developing and developed countries: a resource constraint perspective", *Accounting Research Journal*, Vol. 26 No. 1, pp. 6-34.

McClure, B. (2016), "Use ROA to gauge a company's profits", available at: www.investopedia.com/articles/fundamental/04/012804.asp (accessed 7 December 2018).

Magnan, M., Cormier, D. and Van Velthoven, B. (2005), "Environmental disclosure quality in large German companies: economic incentives, public pressures or institutional conditions?", *The European Accounting Review*, Vol. 14 No. 1, pp. 3-39.

Matolcsy, Z., Chow, D. and Lim, S. (2007), "The association between board composition and different types of voluntary disclosure", *The European Accounting Review*, Vol. 16 No. 3, pp. 555-583.

Mohamed Zain, M. (2009), "Corporate social responsibility in Malaysia", Mustaffa Mohamed Zain, Professorial Lecture, UPENA, Shah Alam (ISBN 978-967-305-362-9).

NASA (2011), "What are climate and climate change?", available at: www.nasa.gov/audience/forstudents/5-8/features/nasa-knows/what-is-climate-change-58.html (accessed 7 December 2018).

Pallant, J. (2011), *SPSS Survival Manual. A Step by Step Guide to Data Analysis Using SPSS Program* 4th ed., Open University Press, Milton Keynes.

Patelli, L. and Prencipe, A. (2007), "The relationship between voluntary disclosure and independent directors in the presence of a dominant shareholder", *European Accounting Review*, Vol. 16 No. 1, pp. 5-33.

Peng, J., Li, Y. and Xiong, D. (2014), "An empirical research on the impact of carbon information disclosure on investment recommendation", *Management & Engineering*, Vol. 16, pp. 101-110.

Pinkse, J., Kolk, A. and Levy, D. (2008), "Corporate responses in an emerging climate regime: the institutionalization and commensuration of carbon disclosure", *The European Accounting Review*, Vol. 17 No. 4, pp. 719-745.

Prado-Lorenzo, J.M., Rodríguez-Domínguez, L., Gallego-Álvarez, I. and García-Sánchez, I.M. (2009), "Factors influencing the disclosure of greenhouse gas emissions in companies world-wide", *Management Decision*, Vol. 47 No. 7, pp. 1133-1157.

Prencipe, A. (2004), "Proprietary costs and determinants of voluntary segment disclosure: evidence from Italian listed companies", *The European Accounting Review*, Vol. 13 No. 2, pp. 319-340.

Qu, W., Leung, P. and Cooper, B. (2013), "A study of voluntary disclosure of listed Chinese firms a stakeholder perspective", *Managerial Auditing Journal*, Vol. 28 No. 3, pp. 261-294.

Rockstrom, J., Steffen, W., Noone, K. and Persson, A. (2009), "A safe operating space for humanity", *Nature*, Vol. 461, pp. 472-475.

Saka, C. and Oshika, T. (2014), "Disclosure effects, carbon emissions and corporate value", *Sustainability Accounting, Management and Policy Journal*, Vol. 5 No. 1, pp. 22-45.

Samaha, K., Khlif, H. and Hussainey, K. (2015), "The impact of board and audit committee characteristics on voluntary disclosure: a meta-analysis", *Journal of International Accounting, Auditing & Taxation*, Vol. 24, pp. 13-28.

Shamil, M.M., Shaikh, J.M., Ho, P.L. and Krishnan, A. (2014), "The influence of board characteristics on sustainability reporting: empirical evidence from Sri Lankan firms", *Asian Review of Accounting*, Vol. 22 No. 2, pp. 78-97.

Sulaiman, M., Abdullah, N. and Fatimaa, A.H. (2014), "Determinants of environmental reporting quality in Malaysia", *International Journal of Economics, Management and Accounting*, Vol. 22 No. 1, pp. 63-90.

Tabachnick, B.G. and Fidell, L.S. (2001), *Using Multivariate Statistics*, 4th ed., Allyn and Bacon, Bostan.

UNEP & UNFCCC (2002), *Climate Change Information Kit*, UNEP and UNFCC, Bonn.

Waldman, D.A., de Luque, M.S., Washburn, N., House, R.J., Adetoun, B., Barrasa, A. and Wilderom, C.P.M. (2006), "Cultural and leadership predictors of corporate social responsibility values of top management: a GLOBE study of 15 countries", *Journal of International Business Studies*, Vol. 37 No. 6, pp. 823-837.

Yusoff, H., Darus, F. and Rahman, S.A.A. (2015), "Do corporate governance mechanism influence environment reporting practices? Evidence from an emerging country", *International Journal of Business Governance and Ethics*, Vol. 10 No. 1, pp. 76-96.

Zeng, S.X., Xu, X.D., Yin, H.T. and Tam, C.M. (2012), "Factors that drive Chinese listed companies in voluntary disclosure of environmental information", *Journal of Business Ethics*, Vol. 109 No. 3, pp. 309-321.

Further reading

CDP (2015), "CDP global climate change report 2015", available at: www.cdp.net/en-US/Results/Pages/reports.aspx (accessed 22 May 2016).

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